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A NEW EULIMID GASTROPOD, *TROCHOSTILIFER EUCIDARICOLA,* PARASITIC ON THE PENCIL URCHIN *EUCIDARIS TRIBULOIDES* FROM THE SOUTHERN CARIBBEAN

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Abstract.—*Trochostilifer eucidaricola* (Prosobranchia, Eulimidae) is described from Aruba, an island north of Venezuela. The parasite lives on the ventral side of the host, close to the peristome, permanently attached by its snout. This is the first Atlantic species of *Trochostilifer,* a genus previously known only from the Indo-Pacific area.

The family Eulimidae contains a large number of species, all of which as far as known, parasitize echinoderms (Warén 1984). Many species have been described from the western Atlantic including the Caribbean, but at present the host is known for only a small number of them. The eulimids represent all different levels of parasitism, from species with normal gastropod anatomy that suck body fluids from the host for a comparatively short time and then leave the host to digest their meal, to species that are permanent endoparasites and can be recognized as gastropods only from the veliger larvae.

The genus *Trochostilifer* Warén, 1980 contains five species, all parasitic on cidaroid sea urchins. Four of these species live in galls in the spines of their hosts. The fifth species, *Trochostilifer striatus* (Hedley, 1901) lives attached to the test of the host close to the peristome in a way similar to the present new species.

Trochostilifer eucidaricola, new species
Figs. 1, 3–8, 14

Holotype.—Zoological Museum, Amsterdam (ZMA Moll. 3.88.004). Female from host number 9 (Fig. 4). Allotype.—Zoological Museum, Amsterdam (ZMA Moll. 3.88.005). Male attached with holotype (Fig. 6).

Paratypes.—Remaining specimens in Zoological Museum, Amsterdam, Swedish Museum of Natural History and U.S. National Museum of Natural History, see Table 1.

Type locality.—Parasitic around peristome of *Eucidaris tribuloides* (Lamarck). Caribbean, Aruba, Malmok, Sandy *Thalassia* flat with *Porites,* 2–7 m depth, under corals and diorite boulders (12°36′N, 70°3.5′W). Leg. I. Peters, Dec 1986.

Material examined.—Known only from the type locality and the material examined, listed in Table 1.

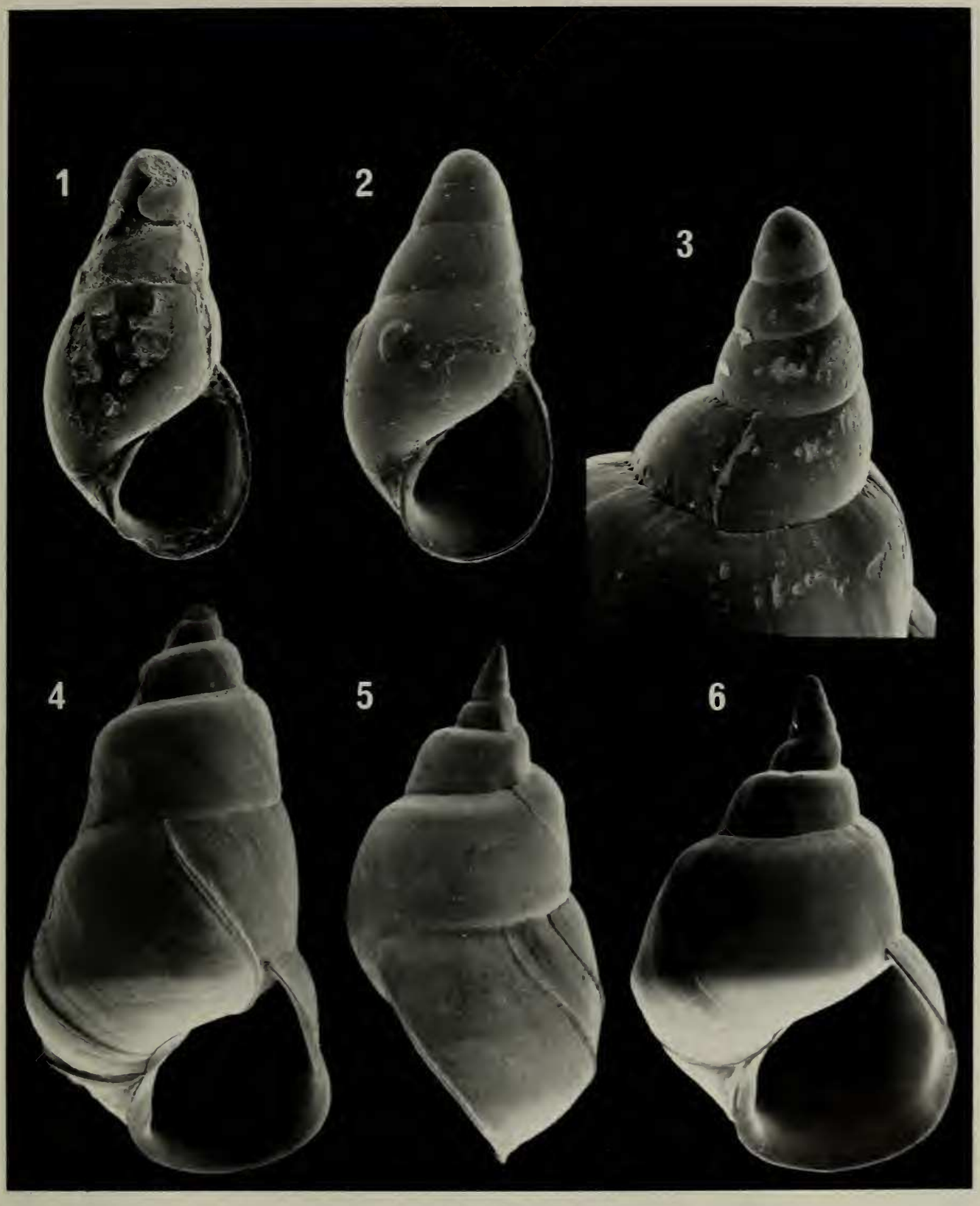
Description.—Female: Shell of medium size, conical, transparent, rather solid, with high, distinctly shouldered whorls and sharply set off larval shell. Larval shell (Figs. 1, 3) of typical eulimid shape, consisting of about four slightly convex, perfectly smooth whorls, of which 650 μm are visible above the teleoconch (Fig. 3). Holotype with about five teleoconch whorls, of which the apical 2.5 whorls are distinctly shouldered and the lower 1.5 almost perfectly flat. Between these there is one transitional whorl. Body whorl distinctly angulated at the periphery with a demarcated basal surface. Shell surface marked by very shallow, indistinct spiral furrows and more obvious, sharp incremental lines plus irregularly appearing, strong incremental scars. Aperture strongly

Table 1.—Specimens of *Eucidaris tribuloides* parasitized by culimids. Explanation: F—female; M—male; O—sex characteristics not developed. Numbers in parenthesis are register numbers in ZMA—Department of Malacology, Zoological Museum of Amsterdam; SMNH—Department of Invertebrate Zoology, Swedish Museum of Natural History; USNM—Division of Mollusks, U.S. National Museum of Natural History. Other specimens kept in ZMA and SMNH.

Specimen number	*T. eucidaricola*	*S. troglodytes*	Eulimid n. sp.
1 (Aug 1986)	F 3.6 mm, M 2.4 mm (SMNH 3847, left on host)	—	3
2 (Dec 1986)	F 3.6 mm, M 2.0 mm, eggs (SMNH 3848)	—	7
3 (May 1986)	O 1.6 mm (ZMA Moll. 3.88.006	2 apical, empty galls; 1 basal gall (Fig. 13), F 4.6 mm, M 2.2 mm, M 2.3 mm, M 2.2 mm, O 0.9 mm (Figs. 9–11) (galls never closed)	7
4 (??? 1986)	—	(1 open apical gall, F 2.8 mm, M 2.2 mm, eggs)	—
5 (Dec 1986)	1 pair lost; F 4.0 mm, M 2.6 mm, eggs (ZMA Moll. 3.88.007–008, left on host)	—	—
6 (Dec 1986)	O 2.0 mm, O 2.0 mm (ZMA Moll. 3.88.009–010)	—	—
7 (Dec 1986)	O 2.2 mm, O 2.2 mm (ZMA Moll. 3.88.011–012)	—	—
8 (Dec 1986)	O 1.6 mm, O 0.6 mm (ZMA Moll. 3.88.013–014)	—	—
9 (Dec 1986)	F 3.6 mm, M 2.0 mm (USNM 859313); F 4.8 mm (holotype), M 2.6 mm (allotype) (ZMA Moll. 3.88.004 and 005)	empty gall	2
10 (Dec 1986)	—	O 0.6 mm, on spine	—
11 (Dec 1986)	—	1 gall with M 2.2 mm, M 2.2 mm, M 1.8 mm, M 1.8 mm (Fig. 15).	—

prosocline. Outer lip thickened, with the most protruding part situated one-seventh of total height from suture. Inner lip thickened, reflected over columella. Height of holotype 4.68 mm (larval shell broken).

Soft parts (based on rehydrated specimens): Head-foot can be almost completely retracted into pallial cavity. Animal pigmented with bright red, especially along right side of visceral mass. Tentacles short, flattened, with subcutaneous eyes situated somewhat laterally to center of bases, meeting above snout to form a "V." Snout large, cylindrical, with distal attachment disc with anterior notch and central proboscis opening. Foot smaller than snout, shapeless but with distinct opercular lobes and large operculum. One large pedal fold on each side of foot. Body of holotype consisting of 2.5 whorls, of which pallial cavity occupies 0.5. Holotype female with large closed pallial oviduct, no penis. Gill with about 25 low



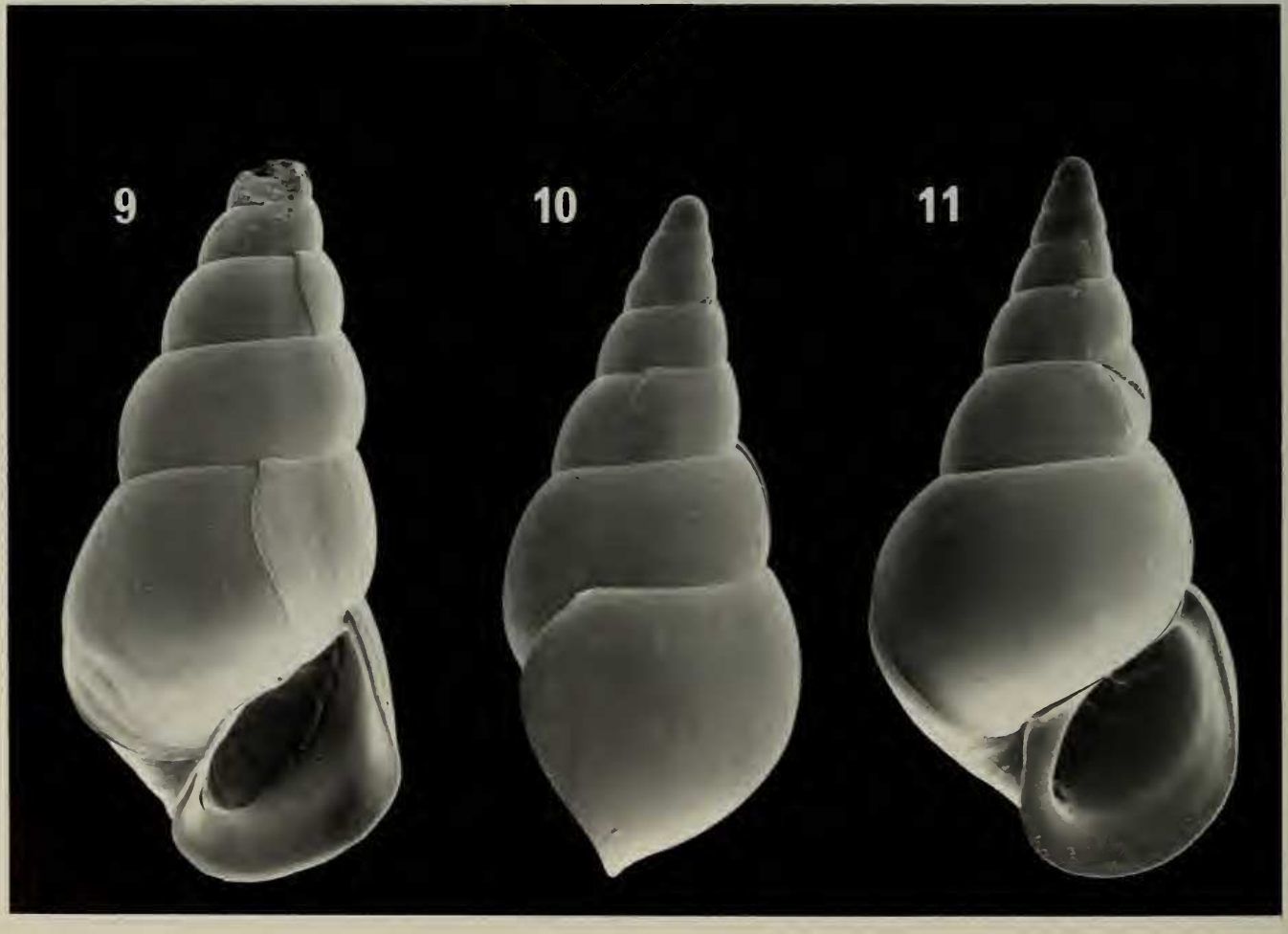
Figs. 1–6. 1, *Trochostilifer eucidaricola* new species, recently settled larva, from host 8, 0.67 mm; 2, *Sabinella troglodytes,* recently settled larva from host 10, 0.67 mm; 3–6, *Trochostilifer eucidaricola* new species; 3, apex of allotype, 0.65 mm of larval shell visible; 4, holotype, 4.68 mm; 5, female paratype from host 2, 3.6 mm; 6, male paratype from host 2, 2.6 mm.

Figs. 7–8. *Trochostilifer eucidaricola,* operculum, female and male, maximum diameter 1.4 and 0.79 mm respectively.

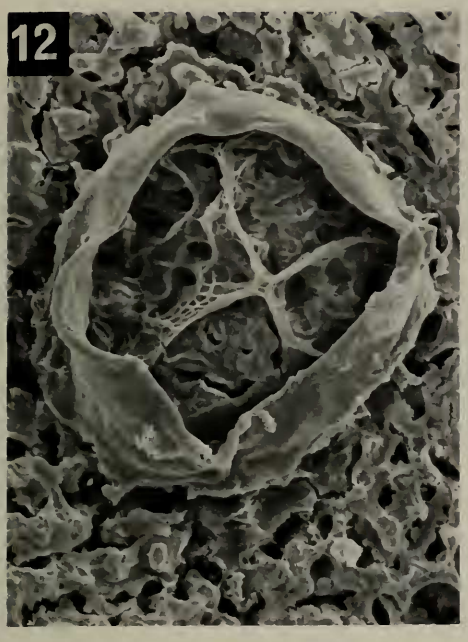
leaflets, occupying almost all space between osphradium and oviduct. Hypobranchial gland anteriorly occupying small, short, triangular area between gill and oviduct, posteriorly forming a very narrow band. Osphradium a simple low ridge in shallow furrow to the left of and along whole length of gill. Operculum (Figs. 7–8) yellowish, thin, paucispiral with thickened part inside the nucleus serving as a muscular attachment.

Male: In fully grown pairs it is less than 0.6 the size of the female. Shell consisting of up to 2.5 teleoconch whorls of shape identical to corresponding whorls of female. Soft parts similar to those of female, but with a simple tentacle-like penis curving forwards, to the right and then backwards along right side of pallial cavity. No trace of female reproductive organs seen. Height of allotype 2.72 mm.

Remarks.—Specimens of *T. eucidaricola* and *Sabinella troglodytes* can easily be distinguished by the apical teleoconch whorls which are strongly shouldered in *T. eucidaricola* and evenly convex in *S. troglo-*



Figs. 9–11. *Sabinella troglodytes,* female (Fig. 9) and two males from host 3, height 4.6, 2.2, and 2.3 mm respectively.



Figs. 12–15. 12, Epidermal fold formed by the host, normally covering distal part of snout of *Sabinella troglodytes*, detail of lower left scar in Fig. 13; 13, Spine of *Eucidaris tribuloides* with deformed (cf. Fig. 15) gall caused by *S. troglodytes*, apical view. The spine has formed 3 "secondary" spines at a right angle to the axis of the original spine. Four attachment scars of epidermal tissue visible. Maximum diameter of spine 5 mm; 14, *Eucidaris tribuloides*, host 1, with male and female of *Trochostilifer eucidaricola*. Primary spine just to the right and dorsal to the pair has been removed to show the pair better. Diameter of test 20 mm; 15, normally formed gall caused by *Sabinella troglodytes*, host 11, length 9.7 mm.

dytes. *Monogamus minibulla* (Olsson & McGinty, 1958) bears some resemblance to *T. eucidaricola* in having the first part of the teloconch distinctly shouldered, but is a much smaller species, ca. 1.5 mm; it has a larval shell of about 1.0 whorl and is parasitic on the sea urchin *Echinometra lucunter* (L.) (Warén, unpub. data).

Among the described species of *Trochostilifer* only *T. striatus* bears any resemblance to *T. eucidaricola.* The other species of the genus have a shell of typical "*Trochus* shape" and live in galls in the spines of their hosts. *Trochostilifer striatus* can, however, easily be distinguished by having a much more distinct spiral sculpture, a larval shell of 1.5 whorls and by having evenly convex apical whorls.

The newly settled larva (Fig. 1) is virtually indistinguishable from that of *Sabinella troglodytes* (Fig. 2), but it is possible that they can be distinguished by the preferred site on the host, because the specimen in Fig. 2 had already started to deform the spine where it was found. This is also the basis for our determination of these two specimens. These determinations are not contradicted by the shape and size of the larval shells of specimens with enough post-larval growth to allow identification by the shape of the teleoconch.

Several dozen specimens of the host urchin were examined and of these 8 were parasitized by this new species. These specimens are enumerated in Table 1. During the examination two more species of eulimids were found on *Eucidaris,* viz. *Sabinella troglodytes* (Thiele, 1925) (Figs. 9–13, 15) and specimens of an undescribed, small, slender, straight-sided species. Because of problems with generic assignment of such species, and because they seemed juvenile, the latter are left undescribed.

A few years ago the senior author examined all material of *Eucidaris tribuloides* in USNM and found several specimens parasitized by *Sabinella troglodytes* from the Caribbean area. No specimens of *Trochostilifer eucidaricola* were then noticed and we assume it to be a more rare and/or locally distributed species.

Sabinella troglodytes lives in galls of the spines of the host and has been reported in the literature several times (Warén 1984). We figure the latter species for comparison, together with two galls. These specimens are also listed in Table 1.

Trochostilifer eucidaricola lives attached to the test of the host by the disc-shaped distal part of the snout, and it seems very unlikely that it is able to move. In the center of the scar on the test of the host there is a very narrow hole, probably caused by the proboscis, but in these dried specimens it proved impossible to trace the proboscis to find the precise way of parasitism. The specimens were almost always attached in couples, between a row of primary spines and the peristome. In two cases also the egg capsules, small globular sacs, were present, attached to the test by a short stalk. Each capsule contained 100–300 eggs, embryos, or veliger larvae ready to hatch. The diameter of the shell of the veligers, consisting of about 0.5 whorls is about 90 μm. This clearly shows that the species has planktotrophic development.

In the five cases when the sex of the specimens in a pair could be determined, the couples consisted of a small male and a larger female. In one case the sex could not be determined, because the specimens had not begun to develop a penis or pallial oviduct. A single specimen was found only on one host, which clearly shows that the distribution is not random, but that larvae prefer to settle on a host already parasitized by a single specimen.

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